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SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			YAMNITZKY, MARIE ROSE	
			ART UNIT	PAPER NUMBER
			1774	

DATE MAILED: 05/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/647,454

Applicant(s)

KITANO ET AL.

Examiner

Marie R. Yamnitzky

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>rec'd 13 June 2005</u> . | 6) <input type="checkbox"/> Other: _____ |

1. Applicant's election without traverse in the reply filed on February 27, 2006 is acknowledged. Applicant elects the species in which the polymer comprises a repeating unit of formula (1) wherein $a = 1$, $b = 0$, each of Ar_1 and Ar_2 is an arylene group, each of E_1 and E_3 is an aryl group and, wherein when the polymer further comprises a repeating unit as in claim 11, the additional repeating unit is a unit of formula (4) wherein Ar_{12} is an arylene group. Applicant points to Polymer Compound 3 in Example 1 on page 107 of the specification as representative of the species elected from claim 11. However, the examiner notes that the additional repeating unit of Polymer Compound 3 is a unit of formula (4) wherein Ar_{12} is a divalent heterocyclic group. The examiner also notes that applicant does not explicitly state an election with respect to Ar_3 of formula (1), but Polymer Compound 3 is a polymer comprising a repeating unit of formula (1) in which Ar_3 is an arylene group.

All claims read on the elected species. While some claims further define one or more variables of one or more species, the claims are not explicitly limited to that which is further defined. For example, while claim 5 further defines each of the Ar variables in formula (2), claim 5 is not limited to a polymer comprising a repeating unit of formula (2) in which each of the Ar variables is present.

With respect to applicant's indication that the examiner required an election of species with respect to two distinct species, the examiner notes that the claims are directed to more than two distinct species. Each of formula (1) and formula (2) represent a subgenus, with each subgenus covering more than one patentably distinct species provided by different combinations of the variables in the formulae.

Although some non-elected species are addressed in this Office action, applicant is cautioned that this action does not represent an action on the merits of all species within the scope of the claims.

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

3. The disclosure is objected to because of the following informalities:

The teachings in the paragraph bridging pages 38 and 39 are inconsistent with Table 1 data for phenyl as the aryl group. In this paragraph, it appears to the examiner that all occurrences of "5" should read --6--, and all occurrences of "6" should read --5--.

Appropriate correction/clarification is required.

4. Claims 2, 3, 7, 8 and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 is included in this rejection as dependent from claim 2. Claim 8 is included in this rejection as dependent from claim 7.

Claims 2, 3, 7 and 8 require selection of a substituted aryl group based on certain calculations. Claims 2 and 7 recite "one of the highest...is arbitrarily selected" (emphasis

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added). It is not clear if “one of the highest” means “the highest”. It is not clear if the results of the calculations will be the same regardless of which one of the highest occupied molecular orbitals is selected.

Claim 9 refers to “the above formula (3)”. Formula (3) does not appear in claim 9, or in claim 6, from which claim 9 depends, or in claim 1, from which claim 6 depends.

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 3, 5-9, 11-13 and 15-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Hsieh (US 5,879,821).

See the whole patent. In particular, see column 4, line 11-c. 12, l. 48 (especially the first formula following c. 4, l. 16, the first formula following c. 6, l. 21, and the teachings at c. 12, l. 19-21), c. 12, l. 16-48, c. 13, l. 12-c. 21, l. 28, c. 30, l. 20-45, c. 31, l. 60, the formula bridging the top of c. 35-36, the formula bridging the bottom of c. 35-36, the formula bridging the top of c. 37-38, the two formulae bridging c. 39-40, the formula bridging c. 41-42, and the claims.

Hsieh anticipates polymer compounds comprising at least one repeating unit of present formula (1) wherein $a = 0$ or 1 , $b = 0$, each of Ar_1 , Ar_2 and Ar_3 represents an arylene group, and each of E_1 and E_3 represents an aryl group which has three substituents. While Hsieh provides

no specific example of a polymer according to the present claims in which each of E_1 and E_3 represents an aryl group which has three substituents, one of ordinary skill in the art at the time of the invention would have at once envisaged such a polymer given Hsieh's disclosure. For example, given Hsieh's disclosure at c. 6, l. 20-44, one of ordinary skill in the art at the time of the invention would have at once envisaged a polymer having a repeating unit of present formula (1) wherein each of E_1 and E_3 represents an aryl group (specifically, a phenyl group) which has three substituents selected from an alkyl group, alkoxy group, or halogen atom.

Regarding the number average-molecular weight limitation of the present claims, Hsieh's broadest number average-molecular weight range overlaps the presently claimed range, and Hsieh's preferred and more preferred ranges are fully within the presently claimed range (see c. 12, l. 16-21).

With respect to present claims 5-9, these claims further define variables found in the repeating unit of formula (2), but do not limit the claimed polymer to a polymer comprising a repeating unit of formula (2). Hsieh anticipates claims 5-9 as drawn to the polymer of claim 1 comprising a repeating unit of formula (1).

With respect to present claim 11, Hsieh anticipates copolymers comprising a repeating unit of present formula (1) and one of various repeating units within the scope of one of present formulae (4)-(7). For example, Hsieh discloses $-\text{CH}=\text{CH}-$ and $-\text{CH}\equiv\text{CH}-$ as possibilities for G' (see c. 6, l. 47-54); these possibilities meet the limitations of a repeating unit of present formula (7) as defined in claim 11. One of ordinary skill in the art at the time of the invention would have at once envisaged such a copolymer from, e.g., the third formula in c. 13. Other

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possibilities for G' as disclosed by Hsieh provide for copolymers according to present claim 11 comprising a repeating unit of formula (4) wherein Ar₁₂ represents an arylene group or divalent heterocyclic group, a repeating unit of formula (5) wherein each of Ar₁₂, Ar₁₃, and Ar₁₄ represents an arylene group or divalent heterocyclic group, each of X₁ and X₂ represents –CH=CH– and –CH≡CH–, and c represents 0 or 1, or a repeating unit of formula (6) wherein Ar₁₂ represents an arylene group or divalent heterocyclic group, and each of X₁ and X₂ represents –CH=CH– and –CH≡CH–.

With respect to present claims 12, 13 and 15-21, see c. 4, l. 52-63 and c. 12, l. 22-48 for example.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 14 and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsieh (US 5,879,821) as applied to claims 1, 3, 5-9, 11-13 and 15-21 above, and for the further reasons set forth below.

With respect to present claim 14, Hsieh teaches that solutions are desirable for use in depositing and forming thin film coatings for article and device fabrication (e.g. see c. 12, l. 22-31), but does not limit the viscosity of such a composition. It would have been within the level

of ordinary skill of a worker in the art at the time of the invention, as a matter of routine experimentation, to determine suitable and optimum viscosities for solutions to be used for article and device fabrication. For example, one of ordinary skill in the art knows that it is easier to form thinner coatings/films with a less viscous solution.

With respect to present claims 22-24, Hsieh teaches that the polymers may be used to make an electroluminescent (EL) device. It was known in the art at the time of the invention to incorporate EL devices into displays such as claimed in present claims 22-24. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to incorporate an EL device according to Hsieh in types of displays in which EL devices were known to be useful at the time of the invention.

9. Claims 1-3, 5-9 and 11-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kreuder et al. (US 5,814,244).

See the whole patent. In particular, see column 2, line 8-c. 7, l. 33 (especially, the two formulae at c. 6, l. 25-31), c. 17, l. 53-c. 18, l. 29, and the claims.

Kreuder et al. provides for polymers comprising a repeating unit of present formula (1) wherein $a = 0$ or 1 and $b = 0$. A polymer according to Kreuder et al. in which Ar^2 , and Ar^4 if present, represents a group of the first formula at c. 25-31 is a polymer comprising a repeating unit of present formula (1) in which E_3 , and E_1 if present, represents heterocyclic group (B) as defined in present claim 1. A polymer according to Kreuder et al. in which Ar^2 , and Ar^4 if present, represents a group of the second formula at c. 25-31 is a polymer comprising a repeating

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unit of present formula (1) in which E₃, and E₁ if present, represents aryl group (A) as defined in present claim 1 and further defined in present claims 2 and 3.

Kreuder et al. do not disclose a specific example of a polymer within the scope of the present claims, and do not limit the number-average molecular weight of the polymers. Kreuder et al. disclose polymers within Kreuder's generic formula (I) having number-average molecular weights within the range set forth in present claim 1. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make other compounds within the scope of Kreuder's generic formula (I), such as polymers in which Ar², and Ar⁴ if present, represents a group of the first or second formula at c. 25-31. It would have been within the level of ordinary skill of a worker in the art at the time of the invention to determine suitable and optimum number-average molecular weights for the polymers and, guided by the examples provided by Kreuder et al., would have reasonably expected number-average molecular weights within the range set forth in present claim 1 to be suitable for Kreuder's polymers.

With respect to present claims 5-9, these claims further define variables found in the repeating unit of formula (2), but do not limit the claimed polymer to a polymer comprising a repeating unit of formula (2). Kreuder et al. suggest claims 5-9 as drawn to the polymer of claim 1 comprising a repeating unit of formula (1).

With respect to present claim 11, Kreuder's general formula (I) provides for copolymers comprising a repeating unit of present formula (1) and a repeating unit of present formula (4), (6) or (7) wherein Ar₁₂ represents an arylene group or divalent heterocyclic group, and X₂ represents -CR₂=CR₃-.

With respect to present claims 12-20, see c. 2, l. 46-52 and c. 17, l. 53-c. 18, l. 25.

Further with respect to present claim 14, Kreuder's examples include the manufacture of an electroluminescent (EL) device by applying a solution of a polymer of Kreuder's general formula (I). Kreuder et al. do not disclose the viscosity of the solution, or limit the viscosity of a solution of the polymer. It would have been within the level of ordinary skill of a worker in the art at the time of the invention, as a matter of routine experimentation, to determine suitable and optimum viscosities for solutions to be used for device fabrication. For example, one of ordinary skill in the art knows that it is easier to form thinner coatings/films with a less viscous solution.

With respect to present claims 21-24, see c. 18, l. 25-29 for example. It was known in the art at the time of the invention to incorporate EL devices into displays such as claimed in present claims 22-24. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to incorporate an EL device according to Kreuder et al. in types of displays in which EL devices were known to be useful at the time of the invention.

10. Claims 1-10, 12, 13 and 15-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al. (US 6,034,206).

See the whole patent. In particular, see column 3, line 41-c. 6, l. 11, c. 9, l. 27-43.

Yamamoto et al. teach that 2,4,6-trimethylaniline, 3,4,5-trifluoroaniline, 2,3,4,5-tetrafluoroaniline or 2,3,4,5,6-pentafluoroaniline may be used to make a polyaryleneamine represented by Yamamoto's general formula (3), (7) or (14). A polymer of Yamamoto's formula (3), (7) or (14) that is made with one of these four specific substituted anilines is a polymer

comprising a repeating unit of present formula (1) wherein $a = 0$, $b = 0$, each of Ar_1 and Ar_3 represents an arylene group, and E_3 represents aryl group (A) as defined in present claim 1 and further defined in present claim 3 as dependent from claim 1. Such a polymer made with 2,4,6-trimethylaniline further meets the limitations of aryl group (A) as defined in claims 2 and 4, and claim 3 as dependent from claim 2. Such a polymer made with 2,3,4,5,6-pentafluoroaniline further meets the limitations of aryl group (A) as defined in claim 2, and claim 3 as dependent from claim 2.

Yamamoto et al. do not limit the number-average molecular weight of the polymers. Yamamoto et al. disclose weight average molecular weights (e.g. see c. 4, l. 47-58) and, as is known in the polymer art, a number-average molecular weight of a polymer is generally less than the weight average molecular weight of a polymer as polymers generally have a polydispersity index greater than 1 (polydispersity index = M_w/M_n). As is known in the art, polydispersity is affected by polymerization conditions. It would have been within the level of ordinary skill of a worker in the art at the time of the invention to determine suitable and optimum number-average molecular weights for the polymers guided by Yamamoto's disclosed weight average molecular weight ranges and knowledge in the art.

With respect to present claims 5-9, these claims further define variables found in the repeating unit of formula (2), but do not limit the claimed polymer to a polymer comprising a repeating unit of formula (2). Yamamoto et al. suggest claims 5-9 as drawn to the polymer of claim 1 comprising a repeating unit of formula (1).

With respect to present claim 10, the required substituted aryl group is within the scope of Yamamoto's disclosure. For example, see c. 5, l. 45-65. A polymer according to Yamamoto's formula (14) wherein each of R^2 and R^4 is hydrogen, each of R^1 and R^5 is an alkyl group having 1-3 carbon atoms, a thioalkyl group having 1-3 carbon atoms or an alkoxy group having 1-3 carbon atoms, and R^3 is an alkyl group having 3-20 carbon atoms, a thioalkyl group having 3-20 carbon atoms or an alkoxy group having 3-20 carbon atoms, meets the limitations of present claim 10. Absent a showing of criticality of a particular combination of substituents, it is the examiner's position that it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make various polymers within the scope of Yamamoto's disclosure. One of ordinary skill in the art would have been particularly motivated to make polymers similar in structure to the polymers made from the specific aniline derivatives disclosed by Yamamoto et al. with the expectation that polymers similar in structure would have similar properties and could be used for similar purposes. A polymer compound according to present claim 10 in which each of R_e , R_f and R_g is an alkyl group having three carbon atoms, for example, is very similar in structure to a polymer compound of Yamamoto's formula (14) made from 2,4,6-trimethylaniline, which is a polymer similar to present claim 10 in which each of R_e , R_f and R_g is an alkyl group having one carbon atom.

With respect to present claims 12 and 15-24, Yamamoto et al. teach that the polymers are expected to be useful in electroluminescent (EL) devices (e.g. see c. 9, l. 39-43). It would have been within the level of ordinary skill of a worker in the art to use the polymers to provide EL devices of conventional structures, to utilize the polymers in combination with additional

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materials known in the art of EL devices, and to incorporate the EL devices in types of displays in which EL devices were known to be useful at the time of the invention.

With respect to present claim 13, the only positive limitation of the claimed ink composition is the polymer compound, and Yamamoto et al. suggest the polymer compound.

11. Claims 1-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woo et al. (US 6,309,763 B1).

See the whole patent. In particular, see column 1, line 32-c. 2, l. 44, c. 4, l. 4-30, c. 10, l. 35-41, c. 11, l. 13-c. 12, l. 14, and claims 1, 2 and 11-16. Note that b in Woo's repeating unit of formula (II), (III) or (IV) may be 3, thus suggesting polymers comprising a repeating unit of present formula (1) wherein $a = 0$ or 1 , $b = 0$, each of Ar_1 and Ar_3 represents an arylene group, and E_3 , and E_1 if present, represents aryl group (A) as defined in present claim 1 and further defined in present claims 2-4 and 10.

Woo's teachings regarding weight average molecular weights and polydispersity at c. 4, l. 15-30 provide for polymers having number average-molecular weights within the range set forth in present claim 1.

Woo et al. do not provide a specific example of a polymer comprising a repeating unit of present formula (1), but such polymers are clearly within the scope of Woo's polymers. Absent a showing of criticality for particular substituents and combinations of substituents for aryl group (A), it is the examiner's position that it would have been within the level of ordinary skill of a

worker in the art at the time of the invention to determine suitable substituted phenyl groups for the (R₃)_b-substituted phenyl group(s) of Woo's repeating unit of formula (II), (III) or (IV).

With respect to present claims 5-9, these claims further define variables found in the repeating unit of formula (2), but do not limit the claimed polymer to a polymer comprising a repeating unit of formula (2). Woo et al. suggest claims 5-9 as drawn to the polymer of claim 1 comprising a repeating unit of formula (1).

Regarding present claim 11, Woo's repeating unit of formula (I) is a repeating unit of present formula (4) wherein Ar₁₂ represents an arylene group.

With respect to present claims 12-24, see c. 10, l. 35-41 and c. 11, l. 13-c. 12, l. 14 for example.

Further with respect to present claim 14, Woo et al. teach that thin films can be formed used a solution comprising the polymer. Woo et al. do not limit the viscosity of such a solution. It would have been within the level of ordinary skill of a worker in the art at the time of the invention, as a matter of routine experimentation, to determine suitable and optimum viscosities for solutions to be used as suggested by the prior art. For example, one of ordinary skill in the art knows that it is easier to form thinner films with a less viscous solution.

Further with respect to present claims 21-24, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to incorporate an EL device according to Woo et al. in types of displays in which EL devices were known to be useful at the time of the invention.

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12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The published application of Towns et al. (US 2001/0037012 A1) suggests a non-elected species within the scope of the present claims. See paragraph [0028] for example, which suggests polymers comprising a repeating unit of present formula (1) wherein E₃ represents heterocyclic group (B) as defined in present claim 1.

13. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

MRY
May 15, 2006



MARIE YAMNITZKY
PRIMARY EXAMINER

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